

I. Rejection of Claims 1-8 under Section 102

Claims 1-8 stand rejected under Section 102 as being anticipated by U.S. Patent No. 6,055,158, issued to Pavlovic. The office action states that Pavlovic '158 teaches a case for dissipating heat that includes an electronic circuit board with a heat generating component thereon. The housing is positioned about the circuit board and electronic component. The office action further states that the housing is made of a thermally conductive polymer material. A protrusion emanates from the housing and contacts the heat generating component.

However, the Pavlovic reference teaches a plastic housing that surrounds the circuit board and heat generating components where the plastic is of a molded plastic or polymer material. The Pavlovic reference is devoid of any teaching of the housing being of a thermally conductive composite material that includes thermally conductive filler therein. The Pavlovic housing is not intended to be a thermal pathway for the transmission of heat generating by the heat generating components. It is the metallic heat transfer members 32 (with portions 42 and 40) that are employed for the transmission of heat. The housing is simply overmolded of plastic only about the heat transfer members 32 to provide containment and structure for the device. The housing is not employed for the transmission of heat whatsoever. This is not surprising considering the housing of Pavlovic is made of only molded plastic or polymer.

In contrast, Applicants' invention includes a unique net-shape moldable housing that is made of a thermally conductive polymer composition that includes a thermally conductive filler material therein. As a result, the entire housing in Applicants' claimed invention is employed to sink away and transmit heat from the heat generating components on the circuit board residing in the housing. In applicants' claimed invention, as amended, the housing is formed from a thermally conductive polymer

composition with thermally conductive filler therein. The formation of such a housing is not shown or suggested by Pavlovic because it is clear from the disclosure of Pavlovic that heat is transferred by the "heat transfer elements" to achieve heat dissipating within the device. Thus, the housing of Pavlovic serves no role in heat management within the device. Unlike Pavlovic, Applicants' invention employs a thermally conductive housing that plays an important role in the heat management within the electronic device case of the present invention.

In view of the foregoing, the Pavlovic '158 reference fails to anticipate Applicants' claimed invention, as amended. Applicant submits that Claims 1 and 5, as amended, are now allowable over the cited prior art. This rejection is moot as to Claims 2 and 6 because they have been canceled herein. Claims 3-4 and 7-8 respectively depend from now allowable Claims 1 and 5 and are also submitted as being allowable. Therefore, Claims 3, 4, 7 and 8 are also submitted as being allowable over Pavlovic.

II. Rejection of Claims 9-11 under Section 103(a)

Claims 9-11 stand rejected under Section 103 as being unpatentable over Pavlovic in view of MacDonald, Jr. et al. It is assumed by Applicants' that Claim 12 is also included in this rejection under Section 103(a) in light of the reference to Claim 12 in the office action on page 3, second to last line. Claim 10 has been canceled rendered moot the rejection of this claim.

The office action states that Pavlovic teaches a case for dissipating heat with an electronic circuit board, a heat generating device thereon with housing made of a thermally conductive polymer material with a heat transfer conduit therethrough. However, Pavlovic does not teach an EMI shield positioned over the circuit board and heat generating component. MacDonald teaches an EMI shield. The office action

states that it would be obvious for Pavlovic to employ the EMI shield taught by MacDonald to shield radiation.

As stated in the specification of the instant application, heat dissipating and EMI shielding are competing efforts within a device case. In the prior art, if heat dissipation is desired, some type of heat sink must be attached to the heat generating device. With such a heat sink occupying the space above the heat generating device, there is no room to place additional components, such as an EMI shield which must shroud the component as well.

The Pavlovic patent teaches a typical heat dissipation device where the heat sink structure occupies the space above the heat generating component. Also, MacDonald, Jr. et al. teach an EMI shield that shrouds the electronic device component. MacDonald, Jr. addresses the issue of simultaneous heat dissipation and EMI shielding by employing a thermally conductive gel for assisting in the dissipation of heat created by the chips present on the circuit board shrouded by the EMI shield. See Col. 3, line 66 to Col. 4, line 10. The thermally conductive gel is present between the EMI shield and the heat generating electronic components.

The office action states that it would be obvious to modify Pavlovic to include the EMI shield of MacDonald et al. to arrive at Applicants' invention. However, as stated above, there is no room to accommodate both the heat transfer members 32 of Pavlovic and the EMI shield/housing 22 of MacDonald et al. More specifically, Pavlovic and MacDonald cannot be combined because if Pavlovic were modified to include the EMI shield (and housing 22) of MacDonald et al., then the heat transfer members 32 of Pavlovic would be completely encapsulated by MacDonald's housing and gel thus making it impossible for the second portions 42 of the heat transfer members of Pavlovic to be exposed to the air outside the box 12 as required by Pavlovic. See Col.

3, lines 38-55. Thus, Pavlovic and MacDonald et al. are incompatible structures and Pavlovic could not function properly, or at all, if modified as suggested in the office action.

Moreover, the disclosure of MacDonald, Jr. et al. further suggests that the combination suggested in the office action is not proper. MacDonald addresses the problem of providing both EMI shielding and heat dissipation in the same assembly by providing a thermally conductive gel 40 present between the EMI shield and the heat generating components. The use of thermally conductive gel provides the thermal conduit for the heat generated by the chips present on the circuit board.

It should be noted that MacDonald provides an assembly for housing circuit boards for use in cellular phones and the like. Due to the size and battery consumption issues of a cellular phone, the chips employed in these devices are inherently low in power. As a result, the chips used therein do not require extreme heat management. However, larger devices, such as laptop computers, employ larger, high power electronic devices. Thus, larger heat sink assemblies and better heat management is required. Thus, the thermally conductive gel of MacDonald, Jr. is typically inadequate for providing the needed thermal dissipation.

Therefore, larger, finned heat sink assemblies that are exposed to air are needed to achieve the needed heat dissipation for these larger and higher power electronic devices. Applicants' invention meets the needs of such devices that include larger, higher power chips that need both a thermal solution and EMI protection. Applicants' claimed invention, as amended, requires a heat transfer conduit that is molded through an aperture through an EMI shield. As a result, a thermal transmission path can be provided while still employing an EMI shield that shrouds the heat generating devices. There is no suggestion or teaching in the prior art why or how Pavlovic would use such a

molded conduit or even an EMI shield. MacDonald, Jr. et al. teaches away from such a combination with Pavlovic and its heat transfer members because a heat dissipation structure (the thermally conductive gel) is already employed in MacDonald, Jr. et al.

Therefore, the combination of Pavlovic and MacDonald, Jr. et al. under Section 103(a) cannot be maintained. Even assuming the combination of Pavlovic and MacDonald, Jr. et al. is tenable, the combined assembly fails to disclose all of the elements of Applicants' claimed invention, as amended.

Applicant submits that pending Claims 9, 11 and 12 are not obvious in view of the combination of Pavlovic and MacDonald, Jr. et al. Furthermore, even assuming the combination is proper, Pavlovic and MacDonald, Jr. et al. fail to teach pending Claims 9, 11 and 12, as amended, under Section 103.

III. Conclusion

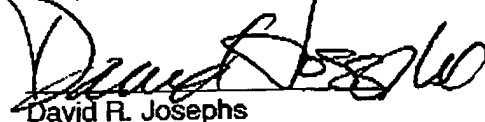
Applicant submits that Claims 1, 5 and 9, as amended, are allowable over the cited prior art well as the claims which are respectively dependent therefrom. In view of the above, Applicants submit that pending Claims 1, 3-5 and 7-9, 11 and 12 are now in condition for allowance. Reconsideration of the Rejections and Objections are requested. Allowance of Claims 1, 3-5 and 7-9, 11 and 12 at an early date is solicited.

If an extension of time is required for timely submission of this response, Applicant hereby petitions for an appropriate extension of time and the Office is authorized to charge Deposit Account 02-0900 for the appropriate additional fees in connection with the filing of this response.

The Examiner is invited to telephone the undersigned should any questions arise.

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Respectfully submitted,



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